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Our reference F17471 PP

Your reference PCT/IB2003/003763

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Attention: Pfahler A.

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Dear Sirs

International Patent Application PCT/IB2003/003763 in the name of Paul Anthony RICHARDS – Our ref: F17471 PP

1. We refer to the first Written Opinion dated 14 October 2004 which issued in connection with the above international application.
2. In the Written Opinion the Examiner has cited the following documents:
D1 : DE 19711841 A1
D2 : JP 60215101 A
D3 : DE 4417763 A1
3. D1 shows an internal gas pressure converter for reducing the amount of time taken to pressurize a gas pressure storage container to a required minimum working pressure. The gas pressure converter is placed inside the storage container and comprises an outer flexible stretchable shell surrounded by a

plastic fibre sleeve, containing two pressure build-up chambers. The gas pressure converter is pressurised to the minimum working pressure and therefore reduces the volume of air needed to fill the storage container to achieve the minimum working pressure. As the pressure increases in the storage container, the gas pressure converter reduces in volume due to the external pressure exerted on it until the minimum working pressure is achieved and the chambers touch each other. The pressure equalisation valve then equalises pressure within the pressure converter to the external pressure in the storage container.

4. D2 shows a multi-control type accumulator for controlling the pressure of liquid or gas in two or more pressure systems to obtain equal and constant pressures in the pressure systems. Elastic bladders which are each connected to a different one of the pressure systems are located inside a pressure vessel charged with a pressure control medium. In the event of a change of pressure in one of the pressure systems, the fluctuating pressure is transferred to the pressure control medium and thereby also to the liquid or gas contained in the other bladders, thus equalising the pressures throughout the pressure systems.
5. D3 describes a process for rendering ammunition/explosive devices harmless by subjecting the explosive shells to very high temperatures within a short period of time, thereby to rupture the shell to permit deflagration gases to escape.
6. Although D1 and D2 describe a pressure vessel containing two elastic bladders, neither D1 nor D2 teaches or even suggests releasable holding means for initially holding a first one of the bladders at a fixed volume and thereafter releasing the other bladder so as to permit the other bladder to expand and exert a force on the first bladder for pressurising the fluid contained within the first bladder. As a result, documents D1 and D2 do not show all of the technical features of claim 1 and it is submitted that claim 1 is as a result, both novel and inventive in view of the disclosures in D1 and D2.
7. Please find enclosed herewith a number of amended sheets which have been marked to show where amendments have been made to the body of the specification and the claims and clean pages incorporating the amendments. In the claims, claim 1 has been amended to include the subject matter of claim 2. Consequently, claim 2 has been cancelled. As a result of the cancellation of claim 2, the claim numbering of subsequent claims has been amended. Original claim 15 has been amended to write out in full the subject matter of claim 1. Additional new claim 15 which is depended upon claim 14, has been added to state that the fluid pressurisation device is equivalent to the further pressurisation devices claimed in any one of claims 3 to 13. Certain other minor amendments have been made to the claims for the sake of clarity and to correct typographical errors. It is submitted that all of the amendments to the

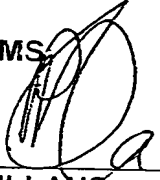
claims are fairly based on the disclosure in the specification prior to amendment.

8. The body of the specification has also been amended to conform to the amendments to the claims and also to correct a minor typographical error on page 6 of the specification.

Yours faithfully

ADAMS & ADAMS

per:


P. PLA-PILLANS

A FLUID PRESSURIZATION DEVICE

FIELD OF INVENTION

THIS INVENTION relates to a fluid pressurization device.

It relates also to an ordnance deflagration device including the fluid pressurization device.

SUMMARY OF INVENTION

According to a first aspect of the invention there is provided a fluid pressurization device including:

a pressure container defining a fixed volume, in use;

a first resiliently deformable inflatable bladder for containing a fluid under pressure, that is located within the pressure container and ~~that is operable to contain a fluid under pressure~~;

a second resiliently deformable inflatable bladder for containing a fluid under a relatively higher pressure than the pressure of the fluid in the first bladder and that is located within the pressure container adjacent the first bladder and that is operable to contain a fluid under pressure; and

MARKED-UP SHEETS

releaseable holding means for initially holding the second bladder at a fixed volume when inflated to thereby hold the fluid contained therein under pressure, and for releasing the second bladder thereby permitting the second bladder to expand and exert a force on the first bladder for pressurizing the fluid contained therein.

~~The first bladder may contain a fluid that is to be discharged from the bladder under pressure and the second bladder may contain a fluid at a relatively higher pressure than the fluid in the first bladder and that is operable to exert a force on the first bladder for pressurizing the fluid contained therein when the holding means releases its hold on the second bladder, in use.~~

The fluid contained in the first bladder may be contain a volatile fluid under pressure and the fluid in the second bladder may be contain a non-volatile fluid at a relatively higher pressure than the pressure of the fluid in the first bladder.

The first bladder may have an opening in which a valve is located, through which fluid can be introduced into and discharged from the first bladder.

The second bladder may have an opening including a valve, through which the second bladder can be inflated with fluid.

The releasable holding means may comprise a flexible sheet element that is wrapped around the second bladder to form a roll surrounding the second bladder wherein portions of the sheet element overlap and contact one another, the rolled-up sheet element being in contact with the second bladder, an inner side of the pressure container and the first bladder in an arrangement wherein frictional forces acting between said overlapping portions of the sheet element and the second bladder in a hoop direction and frictional forces acting between said sheet element and the pressure container and the first bladder, respectively, resist unrolling of the sheet element, in use.

The sheet element may be configured and the first and second bladders may be located in the pressure container, ~~to permit~~ in an arrangement permitting gradual unrolling of the sheet element when fluid is discharged from the first bladder, causing a reduction in size of the first bladder and a consequent reduction in the frictional forces acting between said overlapping portions of the sheet element and the second bladder and the pressure container.

The pressure container may have a frusto-conical shape in said in-use configuration thereof.

The first bladder may have a frusto-conical shape when inflated.

The second bladder may have a frusto-conical shape when inflated.

The sheet material may be tapered towards one end thereof when viewed in plan view, thereby permitting the sheet element to form a roll around the second bladder which has a frusto-conical shape conforming substantially to the shape of the second bladder when inflated.

A relatively narrower end of the sheet element may be wrapped around a relatively narrower end of the second bladder, thereby resulting in the frictional forces acting between the overlapping portions of the sheet element in a hoop direction at said narrower ends, being relatively less than the frictional forces acting in a hoop direction between the overlapping portions of the sheet element at a relatively wider end of the sheet element.

The sheet element may be of fabric material.

The pressure container may be in the form of a flexible bag of a fabric material.

MARKED-UP SHEETS

According to a second aspect of the invention there is provided an ordnance deflagration device including

~~a fluid pressurization device as defined hereinabove in accordance with the first aspect of the invention, wherein the fluid contained in the first bladder is combustible; and~~

a fluid pressurization device including:

- a) a pressure container defining a fixed volume, in use;
- b) a first resiliently deformable inflatable bladder containing a combustible fluid under pressure, that is located within the pressure container, the first bladder having an opening in which a valve is located, through which fluid can be discharged from the first bladder having an opening in which a valve is located, through which fluid can be discharged from the first bladder;
- c) a second resiliently deformable inflatable bladder containing a non-volatile fluid under a relatively higher pressure than the pressure of the combustible fluid in the first bladder and that is located within the pressure container adjacent the first bladder; and
- d) releasable holding means for initially holding the second bladder at a fixed volume when inflated to thereby hold the fluid contained therein under pressure, and for releasing the second bladder thereby permitting the second bladder to expand and exert a force on the first bladder for pressurizing the fluid contained therein; and

a torch that is connected in flow communication with the combustible fluid contained in the first bladder thereby to ignite the fluid to produce a flame that can be used to burn through the casing of unexploded ordnance and into explosive material contained therein, to cause the destruction of said ordnance.

The fluid pressurization device may be equivalent to the fluid pressurization device described and defined hereinabove in accordance with the first aspect of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

Further features of the invention are described hereinafter by way of a non-limiting example of the invention, with reference to and as illustrated in the accompanying diagrammatic drawings. In the drawings:

Figure 1 shows a schematic perspective view, showing hidden detail, of a fluid pressurization device in accordance with the first aspect of the invention;

Figure 2 shows a side view of the pressure container of the fluid pressurization device of Figure 1;

Figure 3 shows a schematic side view of the first inflatable bladder of the fluid pressurization device of Figure 1;

Figure 4 shows a schematic side view of the second inflatable bladder of the fluid pressurization device of Figure 1;

Figure 5 shows a schematic unfolded plan view of the sheet element of the fluid pressurization device of Figure 1;

14, a second bladder 16 and releasable holding means in the form of a sheet element 18, that are located within the pressure container 12.

The pressure container 12 is in the form of a flexible bag of stitched fabric. It will be appreciated that the bag, while being flexible, has a fixed maximum volume when in a fully open condition. The pressure container 12 has two ends 20 and 22 with the end 22 being narrower than the end 20. As such, the pressure container 12 has a generally frusto-conical configuration when fully open. The end 20 of the pressure container 12 defines an opening 24.1 and the end 22 defines an opening 24.2.

The first bladder 14 is of resiliently deformable rubber and has two ends 26 and 28. The first bladder has a shape and dimensions identical to the shape and dimensions of the pressure container 12. The first bladder 14 defines an opening 30 at its end 26 in which a pipe connector 32 including a tyre valve 33, is located.

The second bladder 16 is of resiliently deformable rubber and has a first end 34 and a second end 36. The second bladder 16 has a shape and dimensions identical to the shape and dimensions of the pressure container 12. The second bladder 16 has an opening 38 at its end 36 in which a pipe connector 40 including a tyre valve 39, is located.

The sheet element 18 is of flexible fabric and has two ends 42 and 44. The fabric is formed by taking a rectangular sheet of fabric material and cutting off the corners of the sheet near its end 44, thereby providing the sheet element 18 with a tapered region 46 near its end 44.

The first and second bladders are located in the pressure container adjacent one another with the pipe connector 32 of the first bladder 14 extending through the hole 24.1 of the pressure container 12 and the pipe connector 40 of the second bladder 16 extending through the hole 24.2 of the pressure container 12.

CLAIMS

1. A fluid pressurization device including:
 - a pressure container defining a fixed volume, in use;
 - a first resiliently deformable inflatable bladder for containing a fluid under pressure, that is located within the pressure container ~~and that is operable to contain a fluid under pressure~~;
 - a second resiliently deformable inflatable bladder for containing a fluid under a relatively higher pressure than the pressure of the fluid in the first bladder and that is located within the pressure container adjacent the first bladder ~~and that is operable to contain a fluid under pressure~~; and
 - releaseable holding means for initially holding the second bladder at a fixed volume when inflated to thereby hold the fluid contained therein under pressure, and for releasing the second bladder thereby permitting the second bladder to expand and exert a force on the first bladder for pressurizing the fluid contained therein.
- ~~2. A fluid pressurization device as claimed in Claim 1, wherein the first bladder contains a fluid that is to be discharged from the bladder under pressure and the second bladder contains a fluid at a relatively higher pressure than the fluid in the first bladder and that is operable to exert a force on the first bladder for pressurizing the fluid contained therein when the holding means releases its hold on the second bladder, in use.~~
32. A fluid pressurization device as claimed in Claim 2 1, wherein the fluid contained in the first bladder is first bladder contains a volatile fluid under pressure and the fluid in the second bladder is contains a non-volatile fluid

at a relatively higher pressure than the pressure of the fluid in the first bladder.

43. A fluid pressurization device as claimed in ~~any one of~~ Claims 1 ~~to~~ 3, wherein the first bladder has an opening in which a valve is located, through which fluid can be introduced into and discharged from the first bladder.
54. A fluid pressurization device as claimed in ~~any one of~~ Claims 1 ~~to~~ 4, wherein the second bladder has an opening including a valve through which the second bladder can be inflated with fluid.
65. A fluid pressurization device as claimed in Claim 1 ~~to~~ 5, wherein the releasable holding means comprises a flexible sheet element that is wrapped around the second bladder to form a roll surrounding the second bladder wherein portions of the sheet element overlap and contact one another, the rolled-up sheet element being in contact with the second bladder, an inner side of the pressure container and the first bladder in an arrangement wherein frictional forces acting between said overlapping portions of the sheet element and the second bladder in a hoop direction and frictional forces acting between said sheet element and the pressure container and the first bladder, respectively, resist unrolling of the sheet element, in use.
76. A fluid pressurization device as claimed in Claim 65, wherein the sheet element is configured and the first and second bladders are located in the pressure container, ~~to permit~~ in an arrangement permitting gradual unrolling of the sheet element when fluid is discharged from the first bladder, causing a reduction in size of the first bladder and a consequent reduction in the frictional forces acting between said overlapping portions of the sheet element and the second bladder and the pressure container.

87. A fluid pressurization device as claimed in Claims 76, wherein the pressure container has a frusto-conical shape in said in-use configuration thereof.
98. A fluid pressurization device as claimed in Claim 87, wherein the first bladder has a frusto-conical shape when inflated.
409. A fluid pressurization device as claimed in Claim 98, wherein the second bladder has a frusto-conical shape when inflated.
4110. A fluid pressurization device as claimed in ~~any one of~~ Claims 409, wherein the sheet material is tapered towards one end thereof when viewed in plan view, thereby permitting the sheet element to form a roll around the second bladder which has a frusto-conical shape conforming substantially to the shape of the second bladder when inflated.
4211. A fluid pressurization device as claimed in Claim 4110, wherein a relatively narrower end of the sheet element is wrapped around a relatively narrower end of the second bladder, thereby resulting in the frictional forces acting between the overlapping portions of the sheet element in a hoop direction at said narrower ends, being relatively less than the frictional forces acting in a hoop direction between the overlapping portions of the sheet element at a relatively wider end of the sheet element.
4312. A fluid pressurization device as claimed in Claim 65, wherein the sheet element is of fabric material.
4413. A fluid pressurization device as claimed in ~~any one of the preceding claims~~ Claim 1, wherein the pressure container is in the form of a flexible bag of a fabric material.

1415. An ordnance deflagration device including

~~a fluid pressurization device as claimed in any one of Claims 1 to 14 wherein the fluid contained in the first bladder is combustible; and~~

a fluid pressurization device including:

- a) a pressure container defining a fixed volume, in use;
- b) a first resiliently deformable inflatable bladder containing a combustible fluid under pressure, that is located within the pressure container, the first bladder having an opening in which a valve is located, through which fluid can be discharged from the first bladder having an opening in which a valve is located, through which fluid can be discharged from the first bladder;
- c) a second resiliently deformable inflatable bladder containing a non-volatile fluid under a relatively higher pressure than the pressure of the combustible fluid in the first bladder and that is located within the pressure container adjacent the first bladder; and
- d) releasable holding means for initially holding the second bladder at a fixed volume when inflated to thereby hold the fluid contained therein under pressure, and for releasing the second bladder thereby permitting the second bladder to expand and exert a force on the first bladder for pressurizing the fluid contained therein; and

a torch that is connected in flow communication with the combustible fluid contained in the first bladder thereby to ignite the fluid to produce a flame that can be used to burn through the casing of unexploded ordnance and

into explosive material contained therein, to cause the destruction of said ordnance.

1516. A fluid pressurization device substantially as described in the specification.
An ordnance deflagration device as claimed in Claim 14, wherein the fluid
pressurization device is equivalent to the fluid pressurization device as
claimed in any one of Claims 3 to 13.
- ~~17. A fluid pressurization device substantially as described in the specification,~~
~~with reference to and as illustrated in the accompanying diagrammatic~~
~~drawings.~~
- ~~18. An ordnance deflagration device substantially as described in the~~
~~specification.~~
- ~~19. An ordnance deflagration device substantially as described in the~~
~~specification, with reference to and as illustrated in the accompanying~~
~~diagrammatic drawings.~~

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